Flower Power

Objective:
Students will learn the parts of a flower and their function.

Grade Level: 2-6

Groupings: Pairs or small groups

Materials: Flowers; magnifying glasses or hand lenses; index cards; ***Flower Power Parts*** (see page 229).

Time Allotment: 20 minutes

Extensions:

a. *Have the students mix up the parts from different flowers to create completely new flowers. Challenge them to create new names by using parts of the original names in combination.*

b. *Have a snack of flowers. Serve broccoli, cauliflower, and artichokes with dip; add nasturtiums, calendula petals and Johnny-jump-ups to a salad; or decorate cupcakes with purple violets.*

c. *Go on a wild flower scavenger hunt. Copy pictures of common wild flowers from a field guide and mount them on index cards. Go on a walk in a nearby woods in spring. Pass out the cards to pairs of students and ask them to find the pictured flower. Ask the students not to pick any flowers but to share their discovery with the class. You can also create general scavenger hunt cards, directing the students to find small white flowers, flowers with only three petals, flowers with lots of stamens and pollen, etc.*

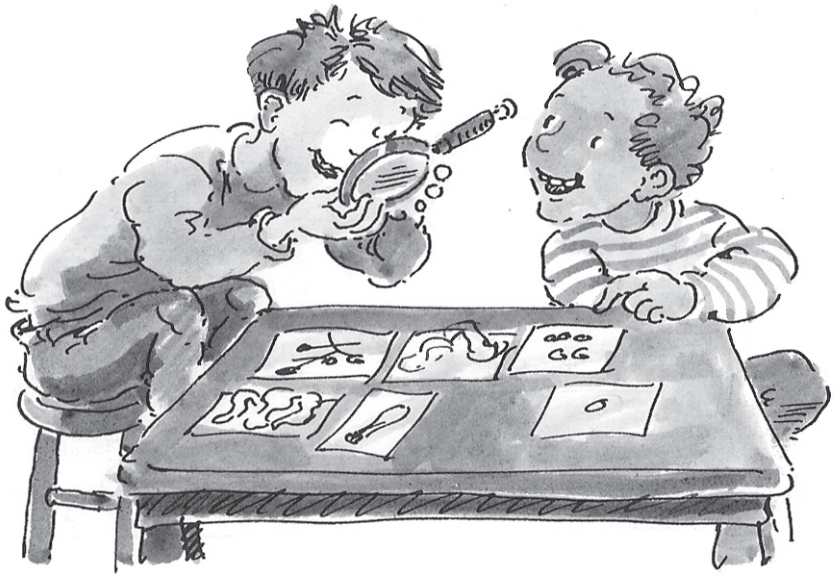
Directions:

1. Discuss the fact that although each person in the class is a unique individual with his or her own special combination of characteristics, we all have certain features in common. Ask the students to name a few. Explain that each flower is also unique, but, like the students, all flowers share some common features. Explain that they will look carefully at different flowers to discover the parts they share in common.

2. Divide the students into pairs and give them a flower, a few index cards, and a hand lens. (It is easiest to use large simple flowers. See page 228 for suggestions.) For younger students, it works best if all the groups have the same type of flower. For older students, it is more interesting if they have different types of flowers.

3. Explain that they will carefully take their flower apart and group the similar parts together. Suggest that they begin by looking the flower over carefully to see how many different kinds of parts they can readily see. Caution them that towards the center of the flower the parts are smaller and harder to distinguish. Remind them to use their hand lenses to check for slight differences.

4. Ask them hold the flower upside down and carefully remove the parts, one at a time, working from the outside toward the inside. Have them place all the like parts together on one index card then count and record the number on the card.



SIMPLE FLOWERS
***to* DISSECT**
Tulips
Lilies
Magnolias
Rhododendrons and Azaleas

These are flowers with large separate parts. In tulips, lilies, and magnolias, the sepals and petals look the same and are called ***tepals****. They are distinguished only by where they occur on the plant, the sepals being the outermost layer.*

COMPLICATED FLOWERS
(avoid dissecting these as the parts are very difficult to identify)
Daisies
Chrysanthemum
Dandelion

These plants are all members of a plant family called the ***Composites.*** *The flowers on these plants are highly specialized. What appears to be one flower is actually many tiny flowers put together. So each white "petal" on a daisy is actually a complete ray flower, and the sunny yellow center is made up of many tiny disk flowers. After you are very familiar with simple flowers and their parts, you might try using a hand lens to dissect one of the yellow "petals" or ray flowers of a large sunflower.*

Directions: (continued)

5. Have them line these cards up in order from the outermost parts of the flower to the innermost parts. Have available several of the same type of flowers that are not to be dissected so students can refer to the original configuration of the parts.

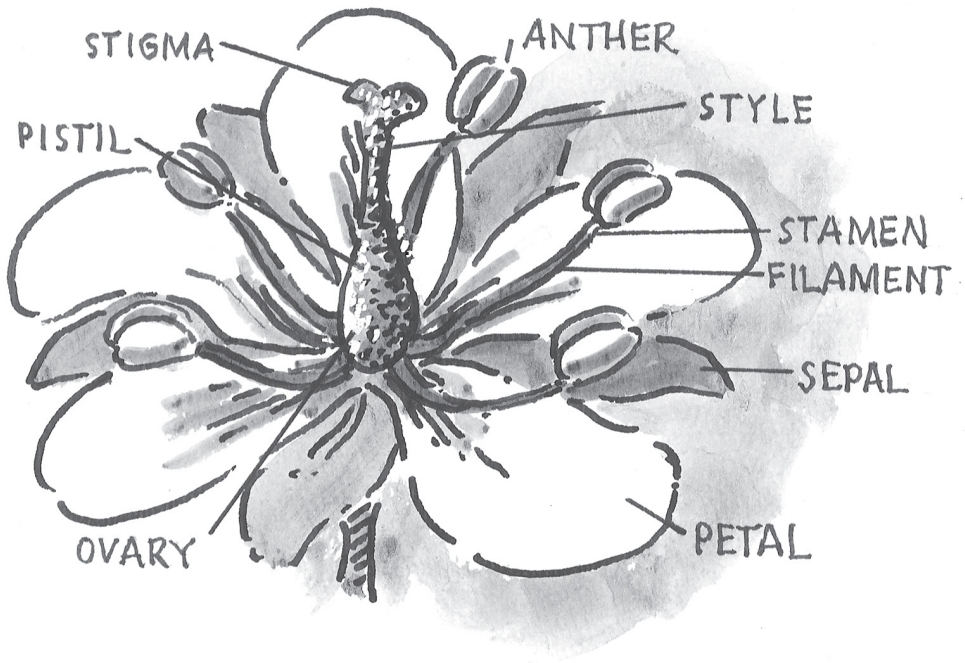
6. Have students compare their results by observing the order, groupings of parts, and the numbers of parts with other groups. Do they see any similarities? Do they see any differences? Do they notice any relationship between the numbers of parts?

7. Explain to the students that the different parts of the flower have names and specific functions in the plant. Give each student a copy of ***Flower Power Parts*** (Page 229) with labelled parts. Review the sheet and have the students label the parts of their flower and discuss their functions.

8. Set out some other flowers and wild flowers and have the students identify the parts. If you have enough, let each group dissect and sort the parts of a different flower. Then have them put the similar parts of these different flowers together for comparisons. For example, ask them to make one group for all the petals, another group for the stamens, and yet another for the pistils.

9. For additional review, pass out ***Flower Power Worksheet*** (page 230) and have students label the flower parts and list their function.

Flower Power Parts



How would you like a bunch of weird, contorted leaves for your birthday? Not especially, you say. Well, that is just what a bouquet of roses is! Flowers are actually a cluster of four kinds of modified leaves arranged in separate groups around a short stem. Look closely at that rose and you can see them.

Turn it over and you will see a little skirt of green leaves around the base. This lower or outermost layer is composed of **SEPALS**. The whole group of them is called the **CALYX**. While in bud, the sepals protect the more delicate flower parts inside. Sepals are usually green, but in lilies and tulips they are colorful and look just like showy petals.

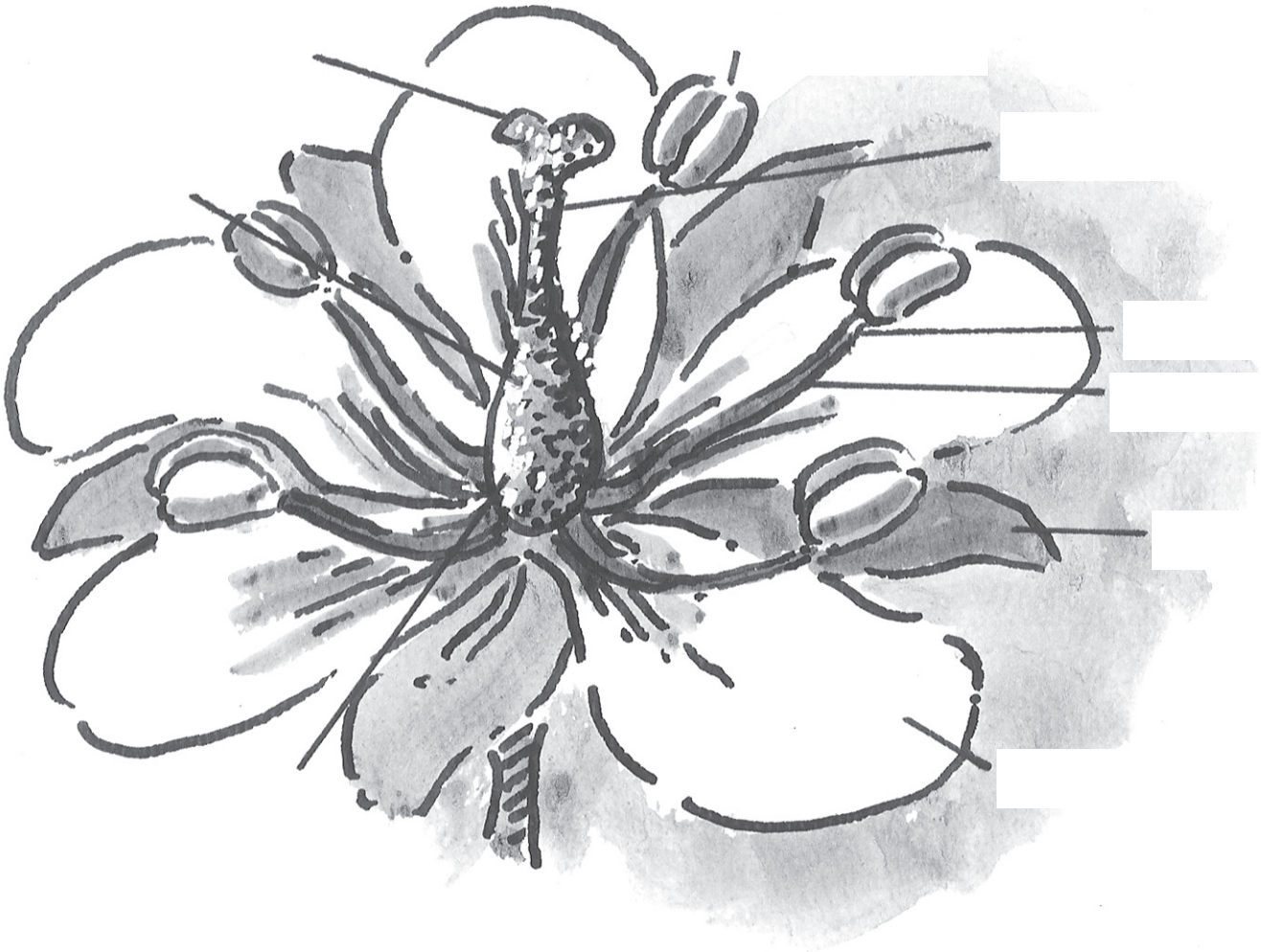
The **PETALS** stand out in a flower because their major function is to attract specific animals to the flower for the purpose of pollination. Petals are variously adapted, colored, shaped and perfumed to insure frequent visits by these specially invited guests, leading to pollination and ultimately the production of seeds.

Look closely inside the petals and you'll see a group of yellow, fuzzy containers on thin stalks. Don't look too closely or you may end up with yellow dust on your nose. That's **POLLEN** from the **STAMENS**. The stamens are composed of a thin **FILAMENT** which holds up an enlarged structure, the **ANTHER**. The anthers are full of pollen and when open, they release the dusty pollen to be picked up by various pollinators (or your nose) and transferred from flower to flower.

Last but not least, hidden among the stamens is the **PISTIL**. There can be just one or many depending upon the flower type. It is always in the right place at the right time, for it can't help but be dusted with pollen in this central location. The pistil is often divided into the three parts. The enlarged base is the **OVARY**, where the seeds develop, and its long thin neck-like **STYLE** ends in a variously divided,branched or lobed **STIGMA**. A sticky stigma no less, all the better to catch pollen, my dear. And pollen on a stigma leads to seed in a fruit!

Flower Power Worksheet

Where are the **SEPALS, PETALS, STYLE, STAMEN, ANTHER, FILAMENT, PISTIL, OVARY** *and* **STIGMA***? Label this flower and indicate the funtion of each part.*



Pollination Parade

Objective:
Students will explore the relationship between flowers and their pollinators.

Grade Level: 4-6

Groupings: Pairs or small groups

Materials: Several different flowers; ***Flower Description Cards*** and ***Pollinator Profile Cards*** (see pages 235 - 36); collection of miscellaneous materials for constructing flowers such as paper plates, drinking straws, toilet paper tubes, crepe paper, assorted scents and flavored extracts, toothpicks, play dough, pipe cleaners, cotton balls, scraps of felt, wire floral stems, and string.

Time Allotment: 30 minutes

Extension:
a. *Have the students conduct a pollination survey. Have them observe a flower over time, noting the different types and behavior of pollinators that visit it.*

Directions:
This activity works best if the students are familiar with the material presented in ***Flower Power*** *(page 227).*

1. Bring in several flowers of different shapes and colors. Ask the students to vote for their favorite flower. When the votes are in, explain that not everyone voted for the same flower as different people have different preferences. Different insects and other plant visitors have flower preferences, too.

2. Explain to the class that the purpose of a flower in the life of a plant is to reproduce the plant. In order to do that, pollen from one flower must be carried to other flowers and vice versa. The pollen fertilizes the pistil of the plant, producing fertile seeds. These seeds can then grow into new plants. Introduce the class to the idea that different flowers are pollinated in different ways. Explain that flowers have evolved specialized parts, shapes, colors, scents, and other characteristics expressly to attract **pollinators —** animals, birds, and insects that spread pollen from flower to flower. The class will construct their own flowers that are adapted in different ways to attract pollinators. Later they will play the role of the various pollinators.

3. Divide the students into pairs or groups. Give each group a ***Flower Description Card***. Using the materials provided, have the students make a three-dimensional flower that meets the requirements detailed on their card. Stress that the flower should have all the basic flower parts unless the description states otherwise.

4. Place the finished flowers with their description cards in a central location in the classroom. Provide time for all the students to observe the flowers.

POLLINATION PARTNERS

Flowers have been 'courting' pollinators for a long time. They have evolved specific colors, shapes, nectars and perfumes to attract them. The most efficient pollinators have been rewarded with a flower designed just for them. Petals have evolved into flat landing platform shapes for bees; foul odors are emitted to lure carrion beetles and flies; and nectar is hidden deep inside long flower tubes where only hummingbirds, moths, or butterflies can reach it. Certain orchids go as far as resembling the females of certain species of bees and wasps, even producing a scent that mimics the mating pheromone. Male bees and wasps are attracted and attempt to mate with the flower, pollinating it in the process. One of the most amazing examples of this coevolution of flowers and pollinators is the yucca plant and yucca moth. The female moth only visits yucca flowers, and at each one she rolls up a large ball of pollen. She carries this pollen ball to another yucca flower and deposits it on the stigma, thereby insuring pollination and seed production. She then lays her eggs in the ovary of this flower, insuring a food source for her hatching larvae which emerge just as the seeds are ripening! It is estimated the larvae only eat about 20% of the seeds before they chew their way out of the ovary and are on their own.

Directions: (continued)

5. Pass ***Pollinator Profile Cards*** to the groups. Have the students read over their card carefully. Explain that each group will now take on the role of the pollinator described on their card. Review the flower descriptions, and ask the pollinators to choose the one flower that best suits their needs. When you say "Go," the pollinators in each group fly, buzz, or crawl to the flower that is best adapted for pollination by them. Review their choices.

6. Show the students examples or pictures of flowers that are pollinated by the various pollinators and compare them to the flowers they made.

POLLINATORS *and their* FLOWERS

Bat: Organ Pipe Cactus (*Stenocereus*), Kapok tree (*Ceiba*), Sausage tree (*Kegelia*), Calabash tree (*Crescentia*).

Bee: Marsh Marigold (*Caltha palustris*), Blue Flag (*Iris*), Foxglove (*Digitalis*).

Butterfly: Wild Blue Phlox (*Phlox*), Daylily (*Hemerocallis*), Wild Geranium (*Geranium*).

Carrion fly: Stinking Benjamin (*Trillium*), Skunk cabbage (*Symplocarpus foetidus*), Carrion flower (*Scapelia*).

Hummingbird: Cardinal flower (*Lobelia cardinalis*), Red columbine (*Aquilega canadensis*), Fuschia, Banana.

Mosquito: Small flowered orchid *(Habenaria elegans).*

Moth: Spanish Bayonet or Yucca (*Yucca*), Tobacco (*Nicotiana*), Evening Primrose (*Oenthera*).

Wind: Paper Birch (*Betula*), Cottonwood (*Populus*), Oak (*Quercus*), and many other temperate trees, also grasses and sedges.

Note: Each pollinator has a specific flower type that it prefers, but it may visit and pollinate many different types of flowers.

Flower Description Cards

1. I am a bright red flower shaped like a long tube fringed with tiny petals. Hidden deep in the tube is lots of nectar. I am very showy and stand out in a crowd, but I have no scent.
2. I am a bright blue, sweet smelling flower. I am tubular in shape with five flat petals on the top. Peek inside: I am full of nectar.
3. I am a white flower. I look like a bell with five zigzag petals on top and nectar hidden inside. I have a very strong, pleasant odor that I emit after sunset. Ahhhh!
4. We are a cluster of tiny white star-shaped flowers with nectar and a little pollen.
5. I am a dark maroon flower with three petals. My color has been compared to red meat. Don't get too close because I smell bad, as if I were rotting. Yuck!
6. I am a bright yellow flower with petals spread open wide. They make a nice landing platform so it is easy to drop in for a visit. Follow the racing stripes on my petals to my nectar supply. Watch out for my anthers, they might dust you with pollen.
7. I am a huge, white, funnel-shaped flower on a thick, strong stalk. I smell very sweet and spicy and have lots and lots of nectar and nutritious pollen.
8. We are small green flowers. Nothing fancy, no petals, no sepals, no scent, just anthers full of pollen. We hang around on long stems and dangle in the breeze.

Answers: 1. *Cardinal flower, hummingbird pollinator.* **2.** *Wild blue phlox, butterfly pollinator.* **3.** *Yucca, moth pollinator.* **4.** *Small flowered orchid, mosquito pollinator.* **5.** *Stinking Benjamin, carrion fly pollinator.* **6.** *Marsh marigold, bee pollinator.* **7.** *Organ pipe cactus, bat pollinator.* **8.** *Paper birch tree flowers, wind pollinator.*

Pollinator Profile Cards

I am a honeybee. I can't see red, but how I love those bright flashy flowers with distinctive patterns on the petals! People often miss the pattern because they can't see like a bee. Just shine an ultraviolet light on that flower and you'll see it as I do. A tisket a tasket, I love to gather lots of pollen in the 'baskets' on my legs.

I am a hummingbird. Red is my favorite color. Give me a flower with a long tube full of nectar. Don't bother with fancy perfume, because I can't smell a thing.

I am the wind. I don't care much about how a flower looks or smells. I just like to blow pollen about. Whooosh!

I am a carrion fly. I love smelly things, like dead fish or rotting meat. Yum!

I am a little male mosquito. I look for tiny light-colored flowers about my size when gathering nectar.

I am a bat. I have a big appetite, so give me a flower with plenty of nectar and pollen. I am on the lookout for light-colored flowers with strong, sweet and spicy smells, as those flowers are easy to find at night

I am a butterfly. Give me a bright-colored flower that stands out in a crowd. I just unroll my long drinking-straw tongue and sip nectar.

I am a moth. I like flowers that are light in color and have a strong, sweet smell as they are easier to find if you fly by night. My long tongue can find and drink up the hidden nectar.